

REMARKS

By the present Amendment, a typographical error has been corrected in the specification. In addition, claim 1 has been amended to recite positive method steps in response to the objections set forth on pages 2 and 3 of the Action. It will be understood that the revisions to claim 1 do not substantially change the scope of the claim, but instead place the claim in a form that is believed to be more acceptable to the Examiner. Furthermore, claim 2 has been amended to recite the film layer more precisely and new claims 12-16 have been added to define further aspects of the invention consistent with the description in the specification such as on page 7, lines 4-11 and various Examples.

As now recited in claim 1, one aspect of the present invention relates to a method for forming a metal film on a non-circuit-formed surface of a semiconductor wafer. The method comprises the steps of applying an adhesive film to a circuit-formed surface of a semiconductor wafer with the adhesive film comprising an adhesive layer formed on one surface of a base film comprising at least one film layer having a gas transmission rate of not more than $49.35 \text{ ml/m}^2 \cdot \text{day/MPa}$. The method further comprises forming a metal film on the non-circuit-formed surface of the semiconductor wafer to which the adhesive film is applied. By using the defined adhesive film, the out-gas for the main surface of the base film can be shielded so that a significant reduction of out-gas occurs. This means that the time for reaching an initial vacuum level can be shortened thereby enhancing the operational workability and productivity of the method. Furthermore, it is possible to prevent the formation of a metal film in a state where the vacuum level has not been reached due to the generated out-gas thereby making it possible to avoid unacceptable

formation of a film caused by the generation of out-gas during the formation of the metal film. Such a discussion can be found on page 6 of the specification and such advantageous results are even more prevalent when the film layer is the outermost layer as discussed on page 7 and recited in certain of the new claims.

The prior art relied on in the Official Action does not disclose or suggest the presently claimed invention and clearly does not recognize the advantages which may be obtained there from. Grupen-Shemansky, U.S. Patent No. 5,268,065 relates to a method for thinning a semiconductor wafer which includes a support film shown in Figure 1. As discussed in the paragraph beginning at column 3, line 4, the tape or support film comprises a polyester layer having thickness of approximately 127 microns, a contact layer comprising a resilient silicone rubber having a thickness of approximately 153 microns and an interlayer there between comprising aluminum having a thickness of less than approximately 0.01 micron. This passage of the patent states that the aluminum interlayer provides additional stiffness, uniform temperature distribution, electrostatic discharge protection and promotes adhesion between the polyester layer and the silicone rubber layer.

The Examiner has recognized that Grupen-Shemansky does not teach the claimed adhesive film with the base film comprising at least one film layer having a gas transmission rate of not more than $49.35 \text{ ml/m}^2 \cdot \text{day/MPa}$. However, the Examiner has asserted that the aluminum layer is not expected to be permeable to gases and has further relied on the discussion in Matsuhiro et al., U.S. Patent No. 6,010,919, at column 10, lines 54-65 (which discloses that thin film 50 formed from a material such as chromium, silicon dioxide, aluminum, titanium or the like, inhibits

penetration of gas) to show that thin aluminum layers are substantially gas impermeable.

Applicants respectfully submit that the combined teachings of Grupen-Shemansky and Matsuhiro et al. would not necessarily lead to the invention as defined in the claims of record. In this respect, the Examiner's attention is respectfully directed to the illustrative Examples and Comparative Example 2. It will be noted therefrom that Comparative Example 2 includes an aluminum oxide layer similar to several of the illustrative Examples, but does not provide the claimed gas transmission rate and provides inferior results relative to those obtained in accordance with the present invention. Thus, this shows that the mere presence of a metal or metal oxide film does not necessarily lead to the claimed level of gas transmission rate recited in the claims. Indeed, it will be further noted that the gas transmission rate of Comparative Example 2 is only slightly higher than the claimed level and yet provides inferior metal film formation contamination. Furthermore, Matsuhiro et al. at column 12, lines 1-4 discloses that the cooling gas can be fed through the thin film 50 to the silicon substrate which shows that the film may inhibit, but does not prevent cooling gas transmission. Thus, the hypothetical combination of patents would not lead to the present invention and clearly would not lead to a recognition of the substantial advantages which can be obtained therefrom.

The additional reliance on Saimoto et al., U.S. Patent Application Publication No. 2002/0106868, for the teaching of an adhesive portion having an elastic modulus of at least 0.1 MPa would not remedy the substantial distinctions set forth above and therefore the claims of record are also patentable even if the teachings of Saimoto et al. where combined with those of the previously discussed patents.

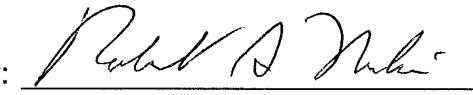
For all of the reasons set forth above, applicants respectfully submit that all issues raised in the Official action have been fully met and therefore applicants request reconsideration and allowance of the present application.

Should the Examiner have any questions concerning the subject application, the Examiner is invited to contact the undersigned attorney at the number provided below.

The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.20(d) and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

Respectfully submitted,

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Date: December 24, 2009